Plant & Animal Genomes XVIII Conference

January 9-13, 2010
Town & Country Convention Center
San Diego, CA

W514 : Recombination

The Rad51 Function : An Evo/Reco Approach In Arabidopsis

Fabien Delacote[1] , **Sophie Massot**[1] , **Didier Shaefer** [2] , **Emmanuel Guiderdoni**[3] , **Fabien Nogue**[2] , **Marie_Pascale Doutriaux MP**[1]

[1] Institut de Biologie des Plantes, Bat 630, CNRS/Université Paris XI, 91405 0rsay France
[2] IJPB, INRA Centre de Versailles, Route de Saint-Cyr, 78026 Versailles Cedex, France
[3] CIRAD, Avenue Agropolis, 34398 Montpellier Cedex 5, France

In an attempt to better understand the « qualities » of Rad51, we set up an Evo/Devo, or Evo/Reco, approach to examine the properties of Rad51 proteins from diverse origins in Arabidopsis. One of our concerns was that gene targeting which is extremely efficient in the moss Physcomitrella patens, is not in Arabidopsis thaliana. We thus wondered if this could be attributed to some specific properties of PpRad51. In the course of this study, we also wondered whether the phenotype of an Arabidopsis rad51 mutant, which is absolutely sterile (Li et al, 2004, PNAS, 101:10596), could be rescued by other Rad51 proteins. As a preliminary observation, we had already determined, using a Y2H approach, that all the tested Rad51 proteins were able to interact with the AtRad51 protein which indicates a high level of conservation of these proteins. We tested along this study the Rad51s from Physcomitrella, from rice, but also from human or yeast. Complementation was partial with Rad51s from Pp or Os, giving rise sometimes to a dominant dmc1-like phenotype at meiosis (Couteau et al, 1999, Plant Cell, 11:723), thus suggesting that the foreign Rad51 poisons the Arabidopsis Dmc1 protein. The human protein was able to restore wt meiosis but in a low proportion of the observed meiocytes, and thus not often enough to restore fertility. This may be related to the ability of these proteins to also interact with AtBrca2 (the protein whose mutations are involved in Breast Cancer in human). We know that Brca2 is essential to meiosis in Arabidopsis, which is related to its interaction with Rad51 and Dmc1 (Siaud et al, 2004, EMBO J, 23:1392). However and despite our efforts, no Brca2-like sequence was ever found in Physcomitrella...